Leptospirosis
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Leptospirosis

Overview [1,2]

For a complete description of leptospirosis, refer to the following texts:

- Control of Communicable Diseases Manual (CCDM).
- Red Book, Report of the Committee on Infectious Diseases.

Case Definition [3]

Clinical description
An illness characterized by fever, headache, chills, myalgia, conjunctival suffusion, and less frequently by meningitis, rash, jaundice, or renal insufficiency. Symptoms may be biphasic.

Laboratory criteria for diagnosis

- Isolation of *Leptospira* from a clinical specimen, or
- Fourfold or greater increase in *Leptospira* agglutination titer between acute- and convalescent-phase serum specimens obtained ≥2 weeks apart and studied at the same laboratory, or
- Demonstration of *Leptospira* in a clinical specimen by immunofluorescence

Case classification
Confirmed: a clinically compatible case that is laboratory confirmed
Probable: a clinically compatible case with supportive serologic findings (i.e., a *Leptospira* agglutination titer of ≥200 in one or more serum specimens)

Information Needed for Investigation

Verify the diagnosis. What laboratory tests were conducted and what were the results?
Establish the extent of illness. Determine if household or other close contacts are ill or have been ill, by contacting the health care provider, patient or family member.
Contact the Regional Communicable Disease Coordinator if an outbreak is suspected.
Contact the Bureau of Child Care if the case is associated with a child care center.

Case/Contact Follow Up And Control Measures

Determine the source of infection including infected animals and contaminated soil and water.

- Identify other persons who may have been exposed to the source of infection.
- Establish if there have been other cases linked by time, place or person.
- Elicit travel history.

Control Measures
See the Control of Communicable Diseases Manual, Leptospirosis, "Methods of control.

See the Red Book, Leptospirosis, "Control Measures.".

Patient control measures [1]
Observe blood/body fluid isolation precautions (private room if patient hygiene is poor, gowning if soiling is likely, gloving for touching blood and body fluids, frequent handwashing, bag and label contaminated articles, avoid needlestick injuries, clean blood spills immediately with 1:10 solution of household bleach).

Laboratory Procedures [2]

Information on laboratory procedures for testing for leptospirosis can be obtained from the Regional Communicable Disease Coordinator or from the SPHL web site at: http://www.dhss.state.mo.us/Lab/index.htm. (14 May 2003) Testing is performed by the Centers for Disease Control and Prevention, but specimens must be submitted through the SPHL.

Specimens:
The diagnosis of leptospirosis is confirmed using the following laboratory tests (along with clinically compatible symptoms):

1. Isolation of *Leptospira interrogans* from blood or urine. Leptospires can be isolated from blood during the first 7 to 10 days of illness and from urine thereafter.
2. Demonstration of a four-fold rise in *Leptospira* agglutination titer between acute and convalescent serum specimens obtained ≥2 weeks apart. Acute and convalescent tests should be performed at the same laboratory.
3. Demonstration of *Leptospira interrogans* in blood or urine using direct fluorescent antibody techniques.

A probable diagnosis of leptospirosis is obtained by demonstration of a *Leptospira* agglutination titer of 1:200 or higher in one or more serum specimens (along with clinically compatible symptoms).

Reporting Requirements

Leptospirosis is a Category II disease and shall be reported to the local health authority or to the Missouri Department of Health and Senior Services (DHSS) within three days of first knowledge or suspicion by telephone, facsimile or other rapid communication.

1. For confirmed and probable cases, complete a "Disease Case Report" (CD-1) and a "Leptospirosis Case Investigation Report" (CDC 52.26).

2. Entry of the completed CD-1 into MOHSIS negates the need for the paper CD-1 to be forwarded to the Regional Health Office.
3. Send the completed secondary investigation form to the Regional Health Office.
4. All outbreaks or "suspected" outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the Regional Communicable Disease Coordinator. This can be accomplished by completing the Missouri Outbreak Surveillance Report (CD-51).
5. Within 90 days of the conclusion of an outbreak, submit the final outbreak report to the Regional Communicable Disease Coordinator.

References

1. Chin, James, ed. "Leptospirosis (Weil disease, Canicola fever, Hemorrhagic jaundice, Mud fever, Swineherd disease)." Control of Communicable Diseases Manual. 17th ed. Washington, DC: American Public Health Association, 2000: 293-296.
2. American Academy of Pediatrics. "Leptospirosis." In: Pickering, LK, ed. 2000 Red Book: Report of the Committee on Infectious Diseases. 25th ed. Elk Grove Village, IL. 2000: 370-372.
3. Centers for Disease Control and Prevention. Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR 1997; 46 (No. RR-10). http://www.cdc.gov/epo/dphsi/casedef/leptospirosis_current.htm. (14 May 2003)

Other Sources of Information

1. Faine, Solly. "Leptospirosis." Bacterial Infections of Humans Epidemiology and Control. 3rd ed. Eds. Alfred S. Evans and Philip S. Brachman: New York: Plenum, 1998: 395-420.
2. Tappero, Jordan W., Ashford, David A., Perkins, Bradley A. "*Leptospira* Species (Leptospirosis)." Principles and Practice of Infectious Diseases. 5th ed. Eds. Gerald L. Mandell, John E. Bennett, and Raphael Dolin. New York: Churchill Livingstone, 2000: 2495-2501.
3. The Merck Veterinary Manual. 8th Ed. Ed. Susan E. Aiello. Whitehouse Station, NJ: Merck & Co., Inc., 1998: 336, 474, 2164. http://www.merckvetmanual.com/mvm/index.jsp (search "leptospirosis" or "leptospira"). (14 May 2003)

Web Resources and Information

1. Centers for Disease Control and Prevention – Leptospirosis http://www.cdc.gov/ncidod/dbmd/diseaseinfo/leptospirosis_g.htm (14 May 2003)
2. Karolinska Institutet - Alphabetic List of Specific Diseases/Disorders (Links) http://www.mic.ki.se/Diseases/c1.html (14 May 2003)

3. Medical Microbiology Online ed S. Brown, http://gsbs.utmb.edu/microbook/ch035.htm (14 May 2003)
4. eMedicine Journal, April 8 2002, Volume 3, Number 4 http://www.emedicine.com/ped/topic1298.htm (14 May 2003)
5. eMedicine Journal, August 14 2001, Volume 2, Number 8 http://www.emedicine.com/emerg/topic856.htm (14 May 2003)
6. Leptospirosis and Your Pet, Centers for Disease Control and Prevention http://www.cdc.gov/ncidod/dbmd/diseaseinfo/leptospirosis_g_pet.htm (14 May 2003)
7. New York State Health Department Questions & Answers about Leptospirosis http://www.health.state.ny.us/nysdoh/consumer/lepto.htm (14 May 2003)
8. Virginia State Health Department Questions and Answers about Leptospirosis (Spanish) http://www.vdh.state.va.us/spanish/leptof.htm (14 May 2003)
9. Technical Information About Leptospirosis in English (Medical Student Information) http://www.medstudents.com.br/dip/dip1.htm (14 May 2003)
10. Technical Information About Leptospirosis in Spanish http://www.ucr.ac.cr/~gacetapc/Leptospirosis.html (14 May 2003)

Leptospirosis
(Weil's disease)
FACT SHEET

What is leptospirosis?
- Leptospirosis is a potentially serious bacterial illness that is most common in the tropics. In Missouri, there are only a few cases reported each year.
- Infected wild and domestic animals pass leptospirosis-causing bacteria in their urine.
- People get leptospirosis by contact with fresh water, wet soil, or vegetation that has been contaminated by the urine of infected animals.
- Leptospirosis is treatable with antibiotics.
- To prevent leptospirosis, minimize contact with fresh water and mud that might be contaminated with the urine of infected animals.

What causes leptospirosis?
Leptospirosis is caused by *Leptospira interrogans*, a corkscrew-shaped bacterium (spirochete).

How is leptospirosis spread?
People get leptospirosis by contact with urine of infected animals. Fresh water, damp soil, or vegetation contaminated by the urine of infected animals can also transmit the disease. People who canoe, raft, wade, or swim in contaminated lakes, rivers, and streams can be at risk of contracting leptospirosis. Leptospirosis is also a problem for people who work in contaminated flood plains or wet agricultural settings.

Leptospirosis bacteria can enter the body through broken skin and mucous membranes. The bacteria can also enter the body when a person swallows contaminated food or water, including water swallowed during water sports. One recent outbreak involved people participating in a swimming meet in a lake in Illinois. Once in the bloodstream, the bacteria can reach all parts of the body and cause signs and symptoms of illness.

What are the symptoms of leptospirosis?
The symptoms of leptospirosis include fever, headache, chills, muscle aches, eye inflammation, vomiting, jaundice, anemia, and sometimes rash. People with leptospirosis are usually quite ill and require hospitalization.

How soon after exposure do symptoms appear?
The incubation period is usually ten days, with a range of 2 to 26 days.

How is leptospirosis diagnosed?
Leptospirosis is diagnosed using a specific laboratory test.

Who gets leptospirosis?
- Farmers, workers in rice fields, sewer workers, and others whose jobs involve contact with water or mud that is contaminated by animal urine, especially the urine of rodents.
- People who take part in freshwater recreational activities in areas where leptospirosis is common (especially tropical areas), especially during the rainy season or in times of flooding.
- Veterinarians and others in contact with animals infected with Leptospirosis.

What is the treatment for leptospirosis?

The antibiotics of choice include penicillin, streptomycin, tetracycline, or erythromycin. Kidney dialysis may be necessary in severe cases.

What are the complications associated with leptospirosis?

If not treated, infections may result in kidney damage, meningitis, liver failure, and respiratory distress. In rare cases, death may occur.

How common is leptospirosis?

Mild leptospirosis is common in tropical countries where people have regular contact with fresh water and animals. In Missouri, fewer than five cases are typically reported each year. The disease is under-diagnosed in the United States. The 50 to 150 cases reported nationally each year are probably only a fraction of the total number of infections.

Is leptospirosis an emerging infectious disease?

Yes. Increased awareness of the disease has led to increased recognition. In 1995, after widespread flooding in Nicaragua, a leptospirosis epidemic killed at least 13 persons and made more than 2,000 others sick. In 1997, nine whitewater rafters from the United States were infected during a river trip in Costa Rica. In 1998, 110 participants in a Triathlon held in Illinois plus a number of local residents who swam in a local lake were infected. Following the 2000 Eco-Challenge in Sabah, Borneo, a number of participants were identified with leptospirosis. This outbreak was possibly reduced in severity by the quick use of worldwide Internet communications to alert participants all over the world and allow them to begin treatment within the incubation period. Leptospirosis is also a problem in deteriorating inner cities that are infested with rats.

How can leptospirosis be prevented?

- Minimize contact with fresh water, mud, and vegetation that might be contaminated with the urine of infected animals, especially rodents.
- Wear protective clothing, such as waterproof boots or waders, when participating in recreational or work activities that might result in contact with contaminated water.
- If your travel plans might put you at risk for leptospirosis, talk to your physician about taking antibiotics before and during travel to help prevent infection from short-term, high-risk exposures.

Missouri Department of Health and Senior Services
Section for Communicable Disease Prevention
Phone: (866) 628-9891 or (573) 751-6113

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL
Atlanta, Georgia 30333

FORM APPROVED
OMB NO. 0920-0009

LEPTOSPIROSIS CASE INVESTIGATION REPORT
(Human Infection)

Case No. _____

I. PATIENT INFORMATION

First four letters of Patient's last name ☐☐☐☐ | Age | SEX 1 ☐ Male 2 ☐ Female

Address *(County/State)* | Occupation

II. CLINICAL DATA

Date of Onset _____ Was patient hospitalized: Yes ☐ 1 No ☐ 2 Unk. ☐ 3

Date of Admission _____ Name of Hospital _____

Date of Discharge or recovery _____ *mo. day yr.* Death: Yes ☐ 1 No ☐ 2 Unk. ☐ 3 Date of Death _____ Autopsy: Yes ☐ 1 No ☐ 2

Name of attending physician: _____

Initial clinical impression:

Leptospirosis ☐ 1 Unknown ☐ 2 Other, specify _____

Presumptive serotype _____

Signs and Symptoms:

	1 Yes	2 No	3 Unk.
(1) Renal involvement			
1. anuria or oliguria	☐	☐	☐
2. elevated BUN (over 20 mg. %)	☐	☐	☐
3. hematuria	☐	☐	☐
4. albuminuria (over "2+")	☐	☐	☐
(2) Liver involvement jaundice	☐	☐	☐
(3) Central nervous system involvement			
1. stiff neck	☐	☐	☐
2. elevated CSF protein (over 50 mg.%)	☐	☐	☐
3. elevated CSF cell count (over 5 cells per ml)	☐	☐	☐

(4) Other manifestations:

III. EPIDEMIOLOGY

(1) Recent contact with animals: Yes ☐ 1 No ☐ 2 Unknown ☐ 3

1. Rodents ☐
2. Dogs ☐
3. Cattle ☐
4. Swine ☐
5. Wild animals ☐
6. Other animals ☐

(2) Water. Recent history of contact in potentially contaminated water (i.e., sewage, streams, ponds, floods, etc.):

1 ☐ Yes 2 ☐ No 3 ☐ Unknown

This report is authorized by law (Public Health Service Act, 42 USC 241). While your response is voluntary, your cooperation is necessary for the understanding and control of the disease.

FOR LEPTOSPIROSIS REFERENCE LABORATORY USE ONLY

(1) SEROLOGY (Agglutination Test)

Serum Specimen Number:	(1)		(2)		(3)		(4)	
Leptospiral Antigens Tested	Mo. Day Yr. _____ day after onset		Mo. Day Yr. _____ day after onset		Mo. Day Yr. _____ day after onset		Mo. Day Yr. _____ day after onset	
	ST	MA	ST	MA	ST	MA	ST	MA
1. *ballum*								
2. *canicola*								
3. *icterohaemorrhagiae*								
4. *bataviae*								
5. *grippotyphosa*								
6. *pyrogenes*								
7. *autumnalis*								
8. *pomona*								
9. *wolffi*								
10. *australis*								
11. *tarassovi*								
12. *georgia*								
13. *Other*								

Other Serologic Tests Performed:
1 ☐ Yes *2* ☐ No
3 FA: ☐
4 HL: ☐
5 Other: ☐

Abbreviations:
MA — microscopic agglutination with live antigen
ST — macroscopic slide agglutination test
HL — Hemolytic test
FA — Fluorescent Antibody test

	Yes	No
(2) DIRECT CULTURE	*1* ☐	*2* ☐
Blood	*3* ☐	
Urine	*4* ☐	
Tissue	*5* ☐	
Other	*6* ☐	

	Yes	No
(3) ANIMAL INOCULATION	*1* ☐	*2* ☐
Blood	*3* ☐	
Urine	*4* ☐	
Tissue	*5* ☐	
Other	*6* ☐	

	Yes	No
(4) DEMONSTRATIONS OF ORGANISMS	*1* ☐	*2* ☐
Blood	*3* ☐	
Urine	*4* ☐	
Tissue	*5* ☐	
Other	*6* ☐	

Leptospires isolated: *1* ☐ Yes *2* ☐ No *3* ☐ Unk.

Serotype isolated _____

Leptospires observed: *1* ☐ Yes *2* ☐ No

Darkfield *1* ☐ FA *2* ☐ Silver Stain *3* ☐

CDC 52.26 (f. 4.173)
REV. 10-87

(3) Describe contacts with animals and water:

IV. LABORATORY EVIDENCE OF LEPTOSPIRAL INFECTION (other than Leptospirosis Reference Laboratory)

Name of Laboratory _____

Location _____

(1) Serology: Specimens examined: *1* ☐ Yes *2* ☐ No

For specimens examined:

Type of Test	Antigens Used	Dates and Titers: Mo. Day Yr. ____ day after onset	Mo. Day Yr. ____ day after onset	Mo. Day Yr. ____ day after onset	Mo. Day Yr. ____ day after onset

(2) Culture:

Material cultured _____ Date _____

Animals inoculated _____

Results _____

(3) Direct examination:

Material examined

Method: Darkfield *1* ☐ Fluorescent antibody *2* ☐ Histopathology *3* ☐

Results _____

Signature _____ Date _____

CDC 52.26 (f. 4.173)
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